

In contrast, upon contacting a human skin, a solution of AGIIS having an acid normality of 28 N, would cause only a mildly warm sensation. There was no irritating effects and the solution did not cause chemical burn even after about 5 minutes at room temperature on the skin.

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**WHAT IS CLAIMED IS:**

1. A prepared nutriment comprising:  
2 a nutriment material; and  
3 an acidic sparingly-soluble Group IIA complex  
4 ("AGIIS").

2. The prepared nutriment of claim 1, wherein the  
2 AGIIS is isolated from a mixture comprising a mineral acid  
3 and a Group IIA hydroxide, or a Group IIA salt of a dibasic  
4 acid, or a mixture of the two.

3. The prepared nutriment of claim 2, wherein the  
2 Group IIA hydroxide is calcium hydroxide, the mineral acid  
3 is sulfuric acid, and the Group IIA salt of a dibasic acid  
4 is calcium sulfate.

4. The prepared nutriment of claim 3, wherein the  
2 AGIIS having a certain acid normality is less effective in  
3 charring sucrose and less corrosive to an animal skin than  
4 a saturated solution of calcium sulfate in sulfuric acid

5 having the same acid normality, and wherein the AGIIS is  
6 non-volatile at room temperature and pressure.

5. The prepared nutriment of claim 1, wherein the  
2 AGIIS, based on the total weight of the prepared nutriment,  
3 ~~ranges from about 0.01 % to about 99.99 %.~~

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6. The prepared nutriment of claim 1, wherein the  
2 nutriment material is food, feed, drink, food supplement,  
3 feed supplement, drink supplement, food dressing,  
4 pharmaceutical, biological product, seasoning, spices,  
5 flavoring agent, or stuffing.

7. A prepared nutriment comprising:  
2 a nutriment material; and  
3 AGIIS prepared by mixing calcium hydroxide and  
4 sulfuric acid with or without the addition of calcium  
5 sulfate.

8. The prepared nutriment of claim 7, wherein the  
2 sulfuric acid contains a predetermined amount of calcium  
3 sulfate.

9. The prepared nutriment of claim 7, wherein the  
2 AGIIS having a certain acid normality is less effective  
3 in charring sucrose and less corrosive to an animal skin  
4 than a saturated solution of calcium sulfate in sulfuric  
5 acid having the same acid normality, and wherein the  
6 AGIIS is non-volatile at room temperature and pressure.

10. The prepared nutriment of claim 7, wherein for  
2 every mole of sulfuric acid used, the amount of calcium  
3 hydroxide ranges from about 0.1 mole to about 0.5 mole.  
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11. The prepared nutriment of claim 7, wherein the  
2 nutriment material is food, feed, drink, food supplement,  
3 feed supplement, drink supplement, food dressing,  
4 pharmaceutical, biological product, seasoning, spices,  
5 flavoring agent, or stuffing.

12. A method for manufacturing a prepared nutriment  
2 comprising:  
3 contacting AGIIS with a nutriment material.

13. A method for manufacturing a prepared nutriment  
2 comprising:  
3 contacting AGIIS with a carrier to give a  
4 constituted carrier; and  
5 blending the constituted carrier with a nutriment  
6 material.

14. A method for destroying organic odor in an  
2 environment, comprising:  
3 spraying the environment with AGIIS.

15. A method for preserving or improving  
2 organoleptic quality of a beverage, a plant product or an

3 animal product, comprising:                    contacting the  
4 beverage, the plant product or the animal product with  
5 AGIIS.

16.     The method of claim 15, wherein the AGIIS is  
~~2 prepared by mixing calcium hydroxide with sulfuric acid~~  
3 with or without calcium sulfate added thereto, and the  
4 AGIIS having a certain acid normality is less effective  
5 in charring sucrose and less corrosive to an animal skin  
6 than a saturated solution of calcium sulfate in sulfuric  
7 acid having the same acid normality, and wherein the  
8 AGIIS is non-volatile at room temperature and pressure.

17.     A method for decreasing pH of AGIIS, the method  
2 comprising:  
3         heating the AGIIS.

18.     The method of claim 17, wherein the AGIIS is  
2 blended into food, feed, drink, food supplement, feed  
3 supplement, drink supplement, food dressing,  
4 pharmaceutical, biological product, seasoning, spices,  
5 flavoring agent, or stuffing.

19.     A method for reducing biological contaminants  
2 in a nutriment comprising:  
3         contacting the nutriment with AGIIS.

20.     The method of claim 19, wherein the AGIIS is  
2 prepared by mixing calcium hydroxide with sulfuric acid

3 with or without calcium sulfate added thereto, and the  
4 AGIIS having a certain acid normality is less effective  
5 in charring sucrose and less corrosive to an animal skin  
6 than a saturated solution of calcium sulfate in sulfuric  
7 acid having the same acid normality, and wherein the  
8 ~~AGIIS is non-volatile at room temperature and pressure.~~

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21. The method of claim 20, where the nutriment is  
2 a fresh fruit, a fruit product, a vegetable produce, a  
3 vegetable product, a meat, a meat product, a fish, a fish  
4 product, a food dressing, or a drink.

22. A method for reducing the pH of a nutriment  
2 comprising:  
3 contacting the nutriment with AGIIS.

23. The method of claim 22, wherein the AGIIS is  
2 prepared by mixing calcium hydroxide with sulfuric acid  
3 with or without calcium sulfate added thereto, and the  
4 AGIIS having a certain acid normality is less effective  
5 in charring sucrose and less corrosive to an animal skin  
6 than a saturated solution of calcium sulfate in sulfuric  
7 acid having the same acid normality, and wherein the  
8 AGIIS is non-volatile at room temperature and pressure.

24. A method for reducing biological contaminants  
2 in an equipment comprising:  
3 contacting the equipment with AGIIS.

25. The method of claim 23, wherein the AGIIS is  
2 prepared by mixing calcium hydroxide with sulfuric acid  
3 with or without calcium sulfate added thereto, and the  
4 AGIIS having a certain acid normality is less effective  
5 in charring sucrose and less corrosive to an animal skin  
6 than a saturated solution of calcium sulfate in sulfuric  
7 acid having the same acid normality, and wherein the  
8 AGIIS is non-volatile at room temperature and pressure.

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26. The method of claim 24, wherein the equipment  
2 is a food-processing equipment, feed-processing  
3 equipment, drink-processing equipment, pharmaceutical  
4 equipment, construction equipment or micro-electronic  
5 equipment.

27. A method for preserving a consumable product,  
2 comprising:  
3 contacting the consumable product with AGIIS.

28. The method of claim 27, wherein the AGIIS is  
2 prepared by mixing calcium hydroxide with sulfuric acid  
3 with or without calcium sulfate added thereto, and the  
4 AGIIS having a certain acid normality is less effective  
5 in charring sucrose and less corrosive to an animal skin  
6 than a saturated solution of calcium sulfate in sulfuric  
7 acid having the same acid normality, and wherein the  
8 AGIIS is non-volatile at room temperature and pressure.

29. The method of claim 27, wherein the consumable  
2 product is a plant product, an animal product, a  
3 pharmaceutical product, a biological product, or a  
4 medical device product.

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30. A method for reducing the quantity of a  
2 biological toxin in a medium, comprising:  
3 contacting the medium with AGIIS.

31. The method of claim 30, wherein the AGIIS is  
2 prepared by mixing calcium hydroxide with sulfuric acid  
3 with or without calcium sulfate added thereto, and the  
4 AGIIS having a certain acid normality is less effective  
5 in charring sucrose and less corrosive to an animal skin  
6 than a saturated solution of calcium sulfate in sulfuric  
7 acid having the same acid normality, and wherein the  
8 AGIIS is non-volatile at room temperature and pressure.

32. The method of claim 30, wherein the medium is a  
2 food, a feed, a pharmaceutical, an equipment, a packaging  
3 material, a drink, a biological product, water, or soil.

33. The method of claim 30, wherein the toxin is an  
2 animal toxin, a bacterial toxin, a botulinus toxin, a  
3 cholera toxin, a streptococcus erythrogenic toxin, a  
4 dinoflagellate toxin, a diphtheria toxin, an erythrogenic  
5 toxin, an extracellular toxin, a fatigue toxin, an  
6 intracellular toxin, a scarlet fever erythrogenic toxin,  
7 or a Tunnickliff toxin.

34. The method of claim 30, wherein the toxin  
2 comprises an endotoxin.

35. The method of claim 35, wherein the toxin  
2 comprises a mycotoxin.

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36. A method for enhancing the bioavailability of a  
2 nutrient in a nutriment, comprising:  
3 adding to the nutriment AGIIS.

37. The method of claim 36, wherein the AGIIS is  
2 prepared by mixing calcium hydroxide with sulfuric acid  
3 with or without calcium sulfate added thereto, and the  
4 AGIIS having a certain acid normality is less effective  
5 in charring sucrose and less corrosive to an animal skin  
6 than a saturated solution of calcium sulfate in sulfuric  
7 acid having the same acid normality, and wherein the  
8 AGIIS is non-volatile at room temperature and pressure.

38. The method of claim 36, wherein the nutrient is  
2 a carbohydrate, a protein, an enzyme, or an acid-stable  
3 vitamin.

39. A method for incorporating AGIIS into a dry  
2 nutriment, comprising:  
3 adding AGIIS to a suitable carrier to give a  
4 premixed product, and



5       blending the premixed product with the dry  
6   nutriment.

40.     The method of claim 39, wherein the AGIIS is  
2   prepared by mixing calcium hydroxide with sulfuric acid  
3   ~~with or without calcium sulfate added thereto, and the~~  
4   AGIIS having a certain acid normality is less effective  
5   in charring sucrose and less corrosive to an animal skin  
6   than a saturated solution of calcium sulfate in sulfuric  
7   acid having the same acid normality, and wherein the  
8   AGIIS is non-volatile at room temperature and pressure.

41.     The method of claim 39, wherein the suitable  
2   carrier is a methylcellulose, a psyllium, bran, rice hull  
3   or corn gluten.

42.     A method for treating a cutaneous anomaly on an  
2   animal, comprising:  
3       treating the cutaneous anomaly with AGIIS.

43.     The method of claim 42, wherein the AGIIS is  
2   prepared by mixing calcium hydroxide with sulfuric acid  
3   with or without calcium sulfate added thereto, and the  
4   AGIIS having a certain acid normality is less effective  
5   in charring sucrose and less corrosive to an animal skin  
6   than a saturated solution of calcium sulfate in sulfuric  
7   acid having the same acid normality, and wherein the  
8   AGIIS is non-volatile at room temperature and pressure.

44. The method of claim 42, wherein the cutaneous  
2 anomaly is a wound or a burn.

45. The method of claim 44, wherein the wound is a  
2 mechanical wound, a spontaneous ulceration, a dermatitis,  
3 or an eruption.

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46. The method of claim 44, wherein the burn is a  
2 chemical burn or a thermal burn.

47. A method for inducing clotting of blood in a  
2 bleeding tissue in an animal, comprising:  
3 contacting the bleeding tissue with an AGIIS.

48. The method of claim 47, wherein the AGIIS is  
2 prepared by mixing calcium hydroxide with sulfuric acid  
3 with or without calcium sulfate added thereto, and the  
4 AGIIS having a certain acid normality is less effective  
5 in charring sucrose and less corrosive to an animal skin  
6 than a saturated solution of calcium sulfate in sulfuric  
7 acid having the same acid normality, and wherein the  
8 AGIIS is non-volatile at room temperature and pressure.

49. The method of claim 47, wherein the bleeding  
2 tissue is an external organ, an internal organ, a  
3 connective tissue, or a nerve tissue.

50. A method for enhancing the adhesion of a first  
2 tissue to a second tissue, comprising:

3       contacting AGIIS with the first tissue or both the  
4 first tissue and the second tissue; and  
5       joining the first tissue with the second tissue.

51.     The method of claim 50, wherein the AGIIS is  
~~2 prepared by mixing calcium hydroxide with sulfuric acid~~  
3 with or without calcium sulfate added thereto, and the  
4 AGIIS having a certain acid normality is less effective  
5 in charring sucrose and less corrosive to an animal skin  
6 than a saturated solution of calcium sulfate in sulfuric  
7 acid having the same acid normality, and wherein the  
8 AGIIS is non-volatile at room temperature and pressure.

52.     The method of claim 50, wherein the first  
2 tissue and the second tissue are animal tissues or plant  
3 tissues.

53.     A method for disinfecting a tissue, comprising:  
2       contacting the tissue with AGIIS.

54.     The method of claim 53, wherein the AGIIS is  
2 prepared by mixing calcium hydroxide with sulfuric acid  
3 with or without calcium sulfate added thereto, and the  
4 AGIIS having a certain acid normality is less effective  
5 in charring sucrose and less corrosive to an animal skin  
6 than a saturated solution of calcium sulfate in sulfuric  
7 acid having the same acid normality, and wherein the  
8 AGIIS is non-volatile at room temperature and pressure.  
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55. The method of claim 53, wherein the tissue is  
2 an animal tissue or a plant tissue.

56. A method for cleaning a product, comprising:  
2 contacting the product with AGIIS.

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57. The method of claim 56, wherein the AGIIS is  
2 prepared by mixing calcium hydroxide with sulfuric acid  
3 with or without calcium sulfate added thereto, and the  
4 AGIIS having a certain acid normality is less effective  
5 in charring sucrose and less corrosive to an animal skin  
6 than a saturated solution of calcium sulfate in sulfuric  
7 acid having the same acid normality, and wherein the  
8 AGIIS is non-volatile at room temperature and pressure.

58. The method of claim 56, wherein the product is  
2 a tissue, a microelectronic product, or a construction  
3 product.

59. The method of claim 58, wherein the  
2 construction product is new or reworked.

60. A method for synchronizing a harvest of a  
2 desired part of a plant, comprising:  
3 contacting the desired part of the plant with AGIIS.

61. The method of claim 60, wherein the AGIIS is  
2 prepared by mixing calcium hydroxide with sulfuric acid

3 with or without calcium sulfate added thereto, and the  
4 AGIIS having a certain acid normality is less effective  
5 in charring sucrose and less corrosive to an animal skin  
6 than a saturated solution of calcium sulfate in sulfuric  
7 acid having the same acid normality, and wherein the  
8 AGIIS is non-volatile at room temperature and pressure.

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62. A method for preserving or improving  
2 organoleptic quality of a desired part of a plant,  
3 comprising:  
4 contacting the desired part of the plant with AGIIS.

63. The method of claim 62, wherein the AGIIS is  
2 prepared by mixing calcium hydroxide with sulfuric acid  
3 with or without calcium sulfate added thereto, and the  
4 AGIIS having a certain acid normality is less effective  
5 in charring sucrose and less corrosive to an animal skin  
6 than a saturated solution of calcium sulfate in sulfuric  
7 acid having the same acid normality, and wherein the  
8 AGIIS is non-volatile at room temperature and pressure.

64. The method of claim 62, wherein the contacting  
2 of the desired part of the plant occurs prior to harvest,  
3 during harvest, during handling, or post harvest.

65. A method for reducing biological contaminants  
2 in water, comprising:

3        adding to the water a sufficient amount of AGIIS to  
4        reduce the biological contaminants.

66.     The method of claim 65, wherein the AGIIS is  
2        prepared by mixing calcium hydroxide with sulfuric acid  
3        with or without calcium sulfate added thereto, and the  
4        AGIIS having a certain acid normality is less effective  
5        in charring sucrose and less corrosive to an animal skin  
6        than a saturated solution of calcium sulfate in sulfuric  
7        acid having the same acid normality, and wherein the  
8        AGIIS is non-volatile at room temperature and pressure.

67.     The method of claim 65, wherein the water is  
2        portable water, storm sewer water, or sanitary sewer  
3        water.

68.     A method for preparing AGIIS comprising:  
2        preparing an aqueous solution of a mineral acid;  
3        preparing an aqueous solution or slurry of a Group  
4        IIA hydroxide or a Group IIA salt;  
5        mixing the aqueous solution of the mineral acid with  
6        the aqueous solution or slurry of the Group IIA hydroxide  
7        or the Group IIA salt;  
8        removing solid formed to isolate AGIIS, and the  
9        AGIIS having a certain acid normality is less effective  
10       in charring sucrose and less corrosive to an animal skin  
11       than a saturated solution of calcium sulfate in sulfuric  
12       acid having the same acid normality, and wherein the  
13       AGIIS is non-volatile at room temperature and pressure.

69. A method for preparing AGIIS comprising:

2 mixing a mineral acid in water with a Group IIA  
3 hydroxide and the resultant AGIIS having a certain acid  
4 normality is less effective in charring sucrose and less  
5 corrosive to an animal skin than a saturated solution of  

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6 calcium sulfate in sulfuric acid having the same acid  
7 normality, and wherein the AGIIS is non-volatile at room  
8 temperature and pressure.

70. The method of claim 69, wherein the mineral  
2 acid is sulfuric acid and the Group IIA hydroxide is  
3 calcium hydroxide.

71. The method of claim 70, wherein for every mole  
2 of sulfuric acid used, the amount of calcium hydroxide  
3 ranges from about 0.1 mole to about 0.5 mole.

72. A method of preparing AGIIS comprising:

2 adding a predetermined amount of calcium sulfate to  
3 an aqueous solution of concentrated sulfuric acid to give  
4 a mixture;  
5 adding a calculated amount of slurry of calcium  
6 hydroxide in water to the mixture to give a reacted  
7 mixture;  
8 removing solid formed in the reacted mixture to give  
9 the AGIIS; and the AGIIS having a certain acid  
10 normality is less effective in charring sucrose and less  
11 corrosive to an animal skin than a saturated solution of

12 calcium sulfate in sulfuric acid having the same acid  
13 normality, and wherein the AGIIS is non-volatile at room  
14 temperature and pressure.

73. The method of claim 72, further comprising  
2 introducing gaseous carbon dioxide into the mixture of  
3 the sulfuric acid containing calcium sulfate and the  
4 calcium hydroxide.

74. The method of claim 70, wherein for every mole  
2 of sulfuric acid used, the amount of calcium hydroxide  
3 ranges from about 0.1 mole to about 0.5 mole.

75. A method for preparing AGIIS having a desired  
2 final acid normality, comprising:  
3 (a) determining the amount of a mineral acid needed  
4 by the following equation:

5 
$$E_1 = (N/2) + (N/2 + B)$$

6 wherein  $E_1$  is the amount of the mineral  
7 acid, in moles, required before making purity adjustment;  
8  $N$  is the desired final acid normality; and  $B$  is the mole  
9 ratio of a Group IIA hydroxide to the mineral acid needed  
10 to obtain the AGIIS having  $N$ , and  $B$  is derived from a  
11 pre-plotted curve depicting the relationship of the

12 mineral acid and the Group IIA hydroxide for a desired  $N$ ;  
13 (b) making purity adjustment for the mineral acid  
14 used by the following equation:

15 
$$E_2 = E_1/C$$



16                wherein  $E_2$  is the amount of the mineral acid, in  
17 moles, required after purity adjustment;  $E_1$  is as defined  
18 above; and C is the purity adjustment factor for the  
19 mineral acid;

20            (c) determining the amount of water, in ml, needed  
21 to be added to the mineral acid by the following

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22 equation:

$$23 \qquad G = J - E_2 - I$$

24                wherein G is the amount of water, in ml,  
25 required to be added to the mineral acid; J is the final  
26 volume of aqueous mineral acid solution; I is the volume  
27 amount of Group IIA hydroxide needed, given below; and  $E_2$   
28 is as defined above;

29            (d) adding G to  $E_2$  to give the final aqueous  
30 solution of the mineral acid, wherein both G and  $E_2$  are as  
31 defined above;

32            (e) determining the amount of Group IIA hydroxide,  
33 in moles, needed by the following equation:

$$34 \qquad F_1 = N/2 \times B$$

35                wherein  $F_1$  is the amount of Group IIA hydroxide,  
36 in moles, needed before making purity adjustment; and B  
37 and N are as defined above;

38            (f) making purity adjustment for the Group IIA  
39 hydroxide used by the following equation:

$$40 \qquad F_2 = F_1/D$$

41                wherein  $F_2$  is the amount of the Group IIA  
42 hydroxide, in moles, required after purity adjustment;  $F_1$   
43 is as defined above; and D is the purity adjustment  
44 factor for the Group IIA hydroxide;

45 (g) determining the amount of water, in ml, needed  
46 to make the solution or slurry of Group IIA hydroxide by  
47 the following equation:

48 
$$H = F_2 \times 1.5$$
 wherein H is the amount of  
49 water, in ml, needed to make the solution or slurry of  
50 Group IIA hydroxide; and  $F_2$  is as defined above;

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51 (h) determining the amount of the aqueous solution  
52 or slurry of Group IIA hydroxide, in ml, needed to be  
53 added to the aqueous solution of mineral acid to give the  
54 AGIIS with a desired final acid normality by the  
55 following equation:

56 
$$I = F_2 \times 2$$

57 wherein I is the amount of Group IIA hydroxide  
58 solution or slurry, in ml, needed; and  $F_2$  is as defined  
59 above;

60 (i) adding H to  $F_2$  to give the final aqueous  
61 solution or slurry of Group IIA hydroxide, wherein both H  
62 and  $F_2$  are as defined above;

63 (j) adding the final aqueous solution or slurry of  
64 Group IIA hydroxide of (i) to the final aqueous solution  
65 of mineral acid of (d);

66 (k) allowing the final aqueous solution or slurry  
67 of Group IIA hydroxide and the final aqueous solution of  
68 mineral acid of (j) to react; and

69 (l) removing solid formed from (K).

76. The method of claim 75 further comprising  
2 adding a Group IIA salt of a dibasic acid to the final  
3 aqueous mineral acid solution of (d).

77. The method of claim 76, wherein the mineral  
2 acid is sulfuric acid, the Group IIA hydroxide is calcium  
3 hydroxide, and the Group IIA salt of a dibasic acid is  
4 calcium sulfate.

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78. The AGIIS having a desired final acid normality  
2 prepared by the method of claim 75.